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Conference Abstract

NFDI4BioDiversity: Biodiversity, ecology and environmental data

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Abstract

Background: The NFDI process in Germany

The digital revolution is fundamentally transforming research data and methods. Mastering this transformation poses major challenges for stakeholders in the domains of science and policy. The process of digitalisation creates immense opportunities, but it must be structured proactively. To this end, the establishment of effective governance mechanisms for research data management (RDM) is of fundamental importance and will be one key driver for successful research and innovation in the future. In 2016 the German Council for Information Infrastructures (RfII) recommended the establishment of a “Nationale Forschungsdateninfrastruktur” (National Research Data Infrastructure, or NFDI), which will serve as the backbone for research data management in Germany. The NFDI should be implemented as a dynamic national collaborative network that grows over time and is composed of various specialised nodes (consortia). The talk will provide a short overview of the status and objectives of the NFDI. It will commence with a description of the goals of the NFDI4BioDiversity consortium which was established for the targeted support of the biodiversity community with data management.

The NFDI4BioDiversity Consortium: Biodiversity, Ecology & Environmental Data

Biodiversity is more than just the diversity of living species. It includes genetic diversity, functional diversity, interactions and the diversity of whole ecosystems. Mankind

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continuous to dramatically impact the earth's ecosystem: species dying-out genetic diversity as well as whole ecosystems are endangered or already lost. Next to the loss of charismatic species and conspicuous change in ecosystems, we are experiencing a quiet loss of common species which together has captured high level policy attention. This has impacts on vital ecosystem services that provide the foundation of human well-being.

A general understanding of the status, trends and drivers of the biodiversity on earth is urgently needed to devise conservation responses. Besides the fact that data are often scattered across repositories or not accessible at all, the main challenge for integrative studies is the heterogeneity of measurements and observation types, combined with a substantial lack of documentation. This leads to inconsistencies and incompatibilities in data structures, interfaces and semantics and thus hinders the re-usability of data to answer scientifically and socially relevant questions. Synthesis as well as hypothesis generation will only proceed when data are compliant with the FAIR (Findable, Accessible, Interoperable and Re-usable) data principles.

Over the last five years these key challenges have been addressed by the DFG funded German Federation for Biological Data (GFBio) project. GFBio encompasses technical, organizational, financial, and community aspects to raise awareness for research data management in biodiversity research and environmental sciences. To foster sustainability across this federated infrastructure the not-for-profit association "Gesellschaft für biologische Daten e.V. (GFBio e.V.)" has been set up in 2016 as an independent legal entity.

NFDI4BioDiversity builds on the experience and established user community of GFBio and takes advantage of GFBio e.V. GFBio already comprises data centers for nucleotide and environmental data as well as the seven well-established data centers of Germany´s largest natural science research facilities, museums and world's most diverse microbiological resource collection. The network is now extended to include the network of botanical gardens and the largest collections of crop plants and their wild relatives. All collections together host more than 75% of all museum objects (150 millions) in Germany and >80% of all described microbial species. They represent the biggest and internationally-relevant data repositories.

NFDI4BioDiversity will extend its community engagement at the science-society-policy interface by including farm animal biology, crop sciences, biodiversity monitoring and citizen science, as well as systems biology encompassing world-leading tools and collections for FAIR data management. Partners of the German Network for Bioinformatics Infrastructure (de.NBI) provide large scale data analysis and storage capacities in the cloud, as well as extensive continuous training and education experiences. Dedicated personnel will be responsible for the mutual exchange of data and experiences with NFDI4 Life-Umbrella, NFDI4Earth, NFDI4Chem, NFDI4Health and beyond.

As digitalization and liberation of data proceeds, NFDI4BioDiversity will foster community standards, quality management and documentation as well as the harmonization and synthesis of heterogeneous data. It will pro-actively engage the user community to build a

coordinated data management platform for all types of biodiversity data as a dedicated added value service for all users of NFDI.

Keywords

biodiversity, ecology, environmental data, FAIRness, Citizen Science, systems biology, NFDI

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